FLORIDA KEYS CORAL REEF ECOSYSTEM
FISH AND HABITAT CENSUS 2002

Marine scientists recently completed an extremely successful oceanographic expedition from Miami to the Tortugas Bank, west of the Dry Tortugas, covering over 230 miles of coast and ocean. During the month long expedition a total of 52 scientists conducted 1806 scuba dives to depths approaching 100 feet. Total bottom time for all dives made during the 2002 Keys-wide expedition was 61, 357 minutes (or 1,023 hours), or 6.4 work months under water spent looking for and assessing fishery and habitat resources in the Florida Keys.

The main objective was to provide a comprehensive survey of coral reefs along the Florida reef tract. Simultaneous surveys were conducted of fishes, corals, conch, spiny lobster, and other reef species using state-of-the-art sampling strategies.

The expedition, lead by Dr. Jerry Ault of the University of Miami's Rosenstiel School of Marine and Atmospheric Science and Dr. Jim Bohnsack of NOAA's Southeast Fisheries Science Center in Miami, included scientists from many state and federal agencies, several universities, and a volunteer non-profit organization. "This research represents an excellent example of coordination, cooperation, and participation by different government agencies, universities, and private organizations to achieve a common goal," said Bohnsack.

"We're extremely concerned about the future of these fishery resources," said Ault. "Previous assessments of the Florida Keys reef fish community have shown that exploitation levels are very high, that many stocks are "overfished," and that overfishing has been clearly evident since the late 1970s." Preliminary results from this year's expedition indicate that the abundance and sizes of exploited fish species are significantly less in sites closest to large human population centers. Size structures of highly desirable reef fishes (i.e., groupers and snappers) were grossly truncated in heavily fished areas. Said Ault, "It took me personally 24 dives in Biscayne National Park before I saw my first legal sized fish, either snapper, grouper or grunt." This observation was made at the same time that the expedition had done well over 400 dives, with the host of expedition divers reporting essentially the same thing. This suggests that exploitation rates in BNP and the northern Keys are higher than we previously estimated, and that areas like the Dry Tortugas and Marquesas have been supporting upper Keys reef fish production for decades.

The expedition was unprecedented in its intensity and spatial coverage. A specially equipped dive boat was chartered to carry 22 divers during each of three 10 day expedition legs. Logistics and at-sea operational support were provided by NOAA's National Undersea Research Center at the University of North Carolina at Wilmington. Scientists surveyed a huge area, from the patch reefs off Miami to the luxuriant coral forests located in the Dry Tortugas. Mixed gas diving (nitrox) was used to provide maximum time on the bottom and up to five repetitive dives per person per day. The total amount of data collected was exceptional. "Our motto was to make every dive count," said Bohnsack; and, "we make no assumptions, we actually take a look" said Ault.

It's the first time we've ever done a whole reef ecosystem assessment at one time," said Ault. "One goal is to develop high-precision monitoring of stock abundance at particular life stages to see what effects fishing regulations and "no-take zones" are having on coral reef fisheries resources throughout the Florida Keys ecosystem." Ault, who specializes in mathematical, statistical and computer modeling of fish stock dynamics, is leading an effort to better understand and manage reef resources to build sustainable fisheries and conserve marine biodiversity. The data collected also will be used by NOAA Fisheries, National Park Service, the U.S. South Atlantic and Gulf of Mexico Fishery Management Councils, and by Florida to better manage coral reefs and fishery resources.

To complement to the fish census, Dr. Steven Miller, of the University of North Carolina at Wilmington's National Undersea Research Center, led an effort that focused on assessing populations of hard and soft corals, sponges, algae, and other sessile organisms that provide structural "habitat" for fishes. John Hunt, of the Florida Fish and Wildlife Conservation Commission, directed a census of spiny lobsters, sea urchins, and queen conch. Said Miller, "It's rare that you get an opportunity to get a system wide view in a short amount of time. Work done during the expedition would have taken us the whole summer to complete if we had to work from shore."

The National Park Service will use the data to assess populations of reef fishes and invertebrates in key habitats in two National Parks. "This information is very timely and will be invaluable to the comprehensive Fisheries Management Plan for Biscayne National Park that the National Park Service is currently developing in cooperation with the Florida Fish and Wildlife Conservation Commission," said Rick Clark, Chief of Resource Management at Biscayne National Park. "The visual censuses will provide for a subsequent robust estimation of population abundance, size structure and habitat uses for all reef habitats within Biscayne National Park." Data will also help establish baseline conditions in order to monitor future changes involving the planned creation of a Research Natural Area in Dry Tortugas National Park.

Scientists reported some good news. The frequency of Goliath Grouper observed in the Tortugas region appears to have increased since the last survey in 2000. Also there was an apparent increase in the diversity and abundance of exploited species in the Tortugas North Ecological Reserve after only one year of protection. "The results are preliminary, but encouraging," said Bohnsack.

The research was supported by grants from NOAA's National Undersea Research Program to the National Undersea Research Center at the University of North Carolina at Wilmington (NURC-UNCW), the Florida Keys National Marine Sanctuary, the National Park Service, and NOAA Fisheries under the coral reef initiative. Operational and logistical support for the expedition was provided by NURC/UNCW